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201. Proposed by J. EDWARD SANDERS, Reinersville, Ohio.

A random straight line is drawn across a circle and another through a given point on the circumference. Find the chance that they intersect within the circle.

Solution by G. B. M. ZERR, A. M., Ph. D., Philadelphia, Pa.

Let  $\theta$  be the angle the line through a given point on the circumference makes with the diameter through the point,  $AB$  = length of this chord.

Then for favorable case of intersection the random line must intersect  $AB = 2a \cos \theta$  where  $a$  = radius of circle.

$$\therefore \text{Chance} = \int_0^{\frac{1}{2}\pi} 2a \cos \theta \, d\theta / \int_0^{\pi} 2a \, d\theta = \int_0^{\frac{1}{2}\pi} \cos \theta \, d\theta / \int_0^{\pi} d\theta = \frac{1}{\pi}.$$

Also solved by the Proposer.

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## PROBLEMS FOR SOLUTION.

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### ALGEBRA.

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326. Proposed by R. D. CARMICHAEL, Princeton University.

Is the series, of which the  $n$ th term is  $\frac{1.3.5.7 \dots (2n-1)}{(n+1)! 2^n (2n+3)}$  convergent? If so, find its sum.

327. Proposed by V. M. SPUNAR, M. and E. E., East Pittsburg, Pa.

The coefficients of the algebraical equation  $f(x) = 0$  are all integers. Show that if  $f(0)$  and  $f(1)$  are both odd numbers, the equation can have no integral roots.

328. Proposed by W. J. GREENSTREET, M. A., Marling School, Stroud, England.

If  $x^3 + xy + y^2 = 3a^2$ , find the maximum value of  $bx + cy$ .

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### GEOMETRY.

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354. Proposed by W. J. GREENSTREET, M. A., Marling School, Stroud, England.

Find the condition that triangles which are circumscribed to one of two confocal parabolas may be inscribed in the other.

355. Proposed by JOHN J. QUINN, New Castle, Pa.

If an indefinite line  $MC$  cuts the  $Y$ -axis at  $A$  a fixed point, and the  $X$ -axis at  $B$ , and at its extremity  $C$  another line  $PCDP'$  be pivoted cutting the  $X$ -axis at  $D$  and extending to  $P'$ , so that  $PC = CD = BC$ , and  $PD = P'D$ : (1) Find the locus of  $P$  and  $P'$  as  $MC$  slides through  $A$ ; (2) Apply to the trisection of an angle; (3) Prove  $PP'$  a constant tangent to upper branch; (4) Show condition which gives rise to loop; (5) Show its relation to conchoid; (6) Discuss for other properties.